

Air Toxics Workgroup (ATW)
Discussion Paper: Limit Permit Modification Reviews to
Changes That Are Meaningful
August 22, 2013 UPDATED DRAFT

ORR (2011) Report Recommendation A-1(2):

R 336.1225 should be amended and specifically include the following:

Limit permit modification reviews to those increases in a Hazard Index exceeding 10% above the previously permitted baseline.

ATW Discussion

Discussion of this issue began at the May 15, 2013 ATW meeting. The idea is that Permit to Install applications and reviews would be more streamlined if previously permitted processes were exempted from R 225 if a company was proposing process changes involving only very minor changes in air toxics emissions. Although the exemption is not proposed to be limited to certain types of operations, the exemption would be particularly beneficial to painting/coating operations, which commonly undergo changes in suppliers or formulations involving relatively minor changes in air toxics emissions.

The ORR report recommendation mirrors an already existing procedure that is utilized by companies and AQD in determining if a change may be exempt from the requirement to obtain a Permit to Install (PTI). Rule 285(b) and 285(c) state that a PTI is not required for:

*“(b) Changes in a process or process equipment which do not involve installing, constructing, or reconstructing an emission unit and which do not involve any **meaningful change in the quality and nature or any meaningful increase in the quantity** of the emission of an **air contaminant** therefrom.*

Examples of such changes in a process or process equipment include the following:

- (i) Change in the supplier or formulation of similar raw materials, fuels, or paints and other coatings.*
- (ii) Change in the sequence of the process.*
- (iii) Change in the method of raw material addition.*
- (iv) Change in the method of product packaging.*
- (v) Change in process operating parameters.*
- (vi) Installation of a floating roof on an open top petroleum storage tank.*
- (vii) Replacement of a fuel burner in a boiler with an equally or more thermally efficient burner.*
- (viii) Lengthening a paint drying oven to provide additional curing time.*

*(c) Changes in a process or process equipment which do not involve installing, constructing, or reconstructing an emission unit and which involve a **meaningful change in the quality and nature, or a meaningful increase in the quantity**, of the emission of an **air contaminant** resulting from any of the following:*

- (i) Changes in the supplier or supply of the same type of virgin fuel, such as coal, no.*

2 fuel oil, no. 6 fuel oil, or natural gas.

(ii) *Changes in the location, within the storage area, or configuration of a material storage pile or material handling equipment.*

(iii) *Changes in a process or process equipment to the extent that such changes do not alter the quality and nature, or increase the quantity, of the emission of the air contaminant beyond the level which has been described in and allowed by an approved permit to install, permit to operate, or order of the department.”* (emphasis added)

Additionally, Rule 285(f) exempts pollution control projects that do not generate a, “...**meaningful quantity of toxics air contaminants.**” This is slightly different phrasing than found in R 285(b) and (c).

However, the terms “meaningful change in the quality and nature”, “meaningful increase in the quantity”, and “meaningful quantity of toxic air contaminants” are not defined in the Statute (NREPA) or in the Rules. The above Rules refer to “air contaminants”, which is a general term that includes the six EPA criteria pollutants and the air toxics. With regard to the criteria pollutants, EPA has objected to the use of these undefined terms in the Rules, as part of the State Implementation Plan (SIP). With regard to the State-only air toxics rules, companies and AQD have utilized a paper presented at an AWMA conference (Avery, 1993; also contained in MDEQ (2005) as Appendix G) that describes a method for determining if a change in air toxics emissions is “meaningful” or not, for Rules 285(b) and (c). The method involves calculating the highest “Hazard Potential (HP)” for the *baseline* condition, which is calculated as the hourly potential to emit (PTE; pounds per hour, pph) divided by the IRSL or ITSL (ug/m³, with the averaging time adjusted to annual, as needed). For the *proposed* condition, the HP is also calculated for each of the air toxics in a similar way. The change in HP is then calculated as the percent increase in HP from the baseline condition to the proposed condition. If there is an increase of 10% or greater, the change may be considered meaningful, and if the change is less than 10% then the change may be considered not meaningful, according to Avery (1993). Avery (1993) also states that proposed increases should be compared to the federal significant emission rates (based on potential to emit on an annual basis); any increase that is 10% or more of those rates should be considered meaningful. All relevant scientific information, including odoriferousness, effects on the environment, and non-inhalation routes of exposure should also be considered (Avery, 1993). In the example calculations provided, one example involved the calculation of the HP based on odor thresholds; the other examples involved air toxics screening levels (ITSLs and IRSLS) (Avery, 1993).

The ATW discussion noted that the meaningful change methodology of Avery (1993) also appears in the MDEQ (2005) report, “Permit to Install – Determining Applicability Guidebook” (*the Guidebook*). The Guidebook describes the method for determining if there is a *meaningful change in the nature of an air contaminant*, as a seven-step method:

1. Identify the TACs (for both the existing operation and proposed modification)
2. Calculate hourly potential to emit (PTE) (in pph)
3. Identify screening levels (ITSLs and IRSLS)

4. Calculate adjusted annual screening levels (all ITSLs with 1-, 8-, and 24-hour averaging times are converted to adjusted annual average ITSLs, using the SCREEN3 model conversion factors (1-hr AT/75; 8-hr AT/18; 24-hr AT/10))
5. Calculate Hazard Potential (HP) (hourly PTE ÷ IRSL or adjusted annual average ITSL)
6. Find TAC with highest HP (for both the existing operation and proposed modification)
7. Determine the percent change in HP (a 10% increase in HP is the criterion for “meaningful”)

It should be noted that these steps do not mention the other relevant scientific information to consider, as mentioned in the Avery (1993) paper (odor thresholds; non-inhalation exposure; effects on the environment).

The Guidebook also describes the same general approach to determining if there is a *meaningful increase in the quantity of an air contaminant* (based on a criterion of a 10% increase). The examples provided in the Guidebook indicate that, **regardless of the HP calculations**, a proposed change is **exempt** from needing a PTI if it passes the Rule 278 requirements and is included under another specific exemption (e.g., Rule 286(e)); and, it is **not exempt** under R 285 if the proposed increase would exceed a permit limit (e.g., a VOC hourly emission rate limit).

Although EPA is not supportive of the undefined term “meaningful” in the Part 2 Rules with regard to the SIP and criteria pollutants, the approach could continue to be utilized for TACs if it was more appropriately defined in the Rules. Because the air toxics rules are not part of the SIP, EPA has no role in reviewing the air toxics rules or an exemption from those rules based on however the DEQ defines a “meaningful” change in air toxics emissions.

The ATW initially discussed how the 10% is determined, and in particular, what is the baseline that is used. It was stated that, in historical practice by at least some parties, the baseline for a process can change outside of the permitting process (as allowed under R 285), so it can be difficult to know what the original baseline was. A Member mentioned that it does not make sense to compare an increase of all chemicals equally as they can have very different effects. Another Member stated that they are concerned with losing the R 285 exemption should AQD determine that it is inappropriately vague. There were also concerns expressed that with a 10% increase allowed under the exemption: the increase could be due to a more toxic compound; thresholds could be exceeded; and, multiple increments of 10% increases could potentially be compounded. Also, there was a comment that the goal should be a reduction in emissions, not an exempt increase in emissions. A Member thought that substances in a proposed emission that have a common mode of action should be evaluated cumulatively. Some Members also expressed a concern that, if the agency were to adopt a restricted list of TACs, then companies may be allowed to make changes to non-TACs without obtaining a permit for the modification, if that is regarded as non-meaningful under R285. Members also expressed concern for how the procedures would handle instances when a chemical’s SLs changed over time, between the time when the baseline was established and when there is a proposed change, for either the *proposed increase in the quantity* situation or the *proposed change in the quality and nature* situation. After these initial ATW discussions, The Members said they would like AQD to draft

language to try to address this recommendation, and, provide detailed examples showing how the procedure would appropriately operate under the various circumstances that may be encountered.

AQD Discussion and Proposal

The concept that some “small” change, or increase, in air toxics emissions may be acceptable and exempted from requiring a permit, has been allowed under R 285 since 1992. This is similar in principle to the assessment of proposed new/increased criteria pollutant emissions in areas that are modeled to exceed a NAAQS standard; such emissions of criteria pollutants are deemed as not causing *or contributing to* a NAAQS exceedance if the modeled impacts are below “significant impact levels (SILs)”; the various SILs vary from about 1-5% of the NAAQS.

AQD’s position is that the key definitions for implementing R 285 should be in the Rules. The use of the currently available method for air toxics, as it appears in guidance documents (Avery, 1993; MDEQ, 2005), is not sustainable. While addressing the EPA’s objections to Rule 285 regarding the criteria pollutants is outside the scope of the ATW, the ATW can recommend an approach for the air toxics.

AQD proposes that certain key elements of the available guidance (Avery, 1993; MDEQ, 2005) be developed into proposed Rules defining the key terms. Some aspects of the available guidance are proposed to be modified due to concerns of ATW Members and AQD staff. Once promulgated as Rules, the definitions would be applied to R 285, for air toxics only. The greatest benefit for regulatory streamlining would be to clarify the key terms and enable the continued use of the R 285 exemption from needing a Permit to Install. If that can be accomplished, then there does not appear to be a significant additional benefit (in terms of easier or faster permit application development or approval) in developing a new Rule that would provide an exemption from R 225 for proposed changes that do require a permit (i.e., for proposed modifications that do not qualify for an exemption from needing a PTI under Rule 285 or any other exemption Rule). The Members generally agreed on that point.

Permit exemptions are designed to allow a person to install and operate an exempt process and to make certain changes to existing processes and process equipment without having to receive approval from the AQD. It should be noted that companies have the responsibility to maintain records to demonstrate compliance with any permit exemption rule being utilized. With regard to the exemptions addressed in this discussion paper, the relevant records would include the baseline and proposed PTE and the baseline SLs and the SLs for the proposed change. The AQD does not have a formal approval process for exemptions.

The proposed key definitions (which would appear in the Part 2 Rules) are:

“Meaningful change in the quality and nature” means a change in the toxic air contaminants emitted that results in an increase in the cancer or noncancer hazard potential that is 10% or greater, or which causes an exceedance of a permit limit. The

hazard potential is the value calculated for each toxic air contaminant involved in the proposed change, before and after the proposed change, and it is the potential to emit (hourly averaging time) divided by the IRSL or the adjusted annual ITSL, for each toxic air contaminant and screening level involved in the proposed change. The adjusted annual ITSL is the ITSL that has been adjusted as needed to an annual averaging time utilizing averaging time conversion factors in accordance with the models and procedures in 40 C.F.R 51.160(f) and Appendix W adopted by reference in R 336.1299. The percent increase in the hazard potential is determined from the highest cancer and noncancer hazard potential before and after the proposed change. The potential to emit before the proposed change is the baseline potential to emit established in an approved PTI application on or after 4/17/92 that has not been voided or revoked, unless it has been voided due to incorporation into a renewable operating permit.

“Meaningful increase in the quantity of the emission” means an increase in the potential to emit (hourly averaging time) of a toxic air contaminant that is 10% or greater compared to a baseline potential to emit, or which results in an increase in the cancer or noncancer hazard potential that is 10% or greater, or which causes an exceedance of a permit limit. The baseline is the potential to emit established in an approved PTI application on or after 4/17/92 that has not been voided or revoked, unless it has been voided due to incorporation into a renewable operating permit.

It should be noted that the term “potential to emit” (PTE) is already defined in AQD’s Rule 116(m).

The proposed definitions continue the AQD policy and practice of considering air toxics emission increases or hazard potential (HP) increases of less than 10% as not meaningful for purposes of the Rule 285 exemption. However, the definitions make clear that proposed changes are not exempt if they would result in the exceedance of a permit limit, even if the increase in a TAC emission or in the HP are less than 10%. And, carcinogenic and noncarcinogenic effect-based SLs should be segregated from each other, not mixed together as in the current guidance. Many air toxics have IRSLs and ITSLs, and some have two ITSLs; the draft language makes clear that an HP must be calculated for all SLs. As a consequence of the segregation of carcinogenic and noncarcinogenic effects, if a proposed emission involves both an ITSL and an IRSL then a baseline would be needed for each in order to perform the HP calculation for each and to potentially qualify for the exemption. The draft definitions also continue the practice of converting ITSLs to adjusted annual average ITSLs using the EPA scaling factors (in the AERSCREEN guidance; EPA, 2011), despite the reservations of at least one Member about the accuracy of those conversion factors; the practice is proposed to continue due to a lack of a known more appropriate method. AQD modelers recommend the AT conversion factors in AERSCREEN over those in SCREEN3, because they are believed to be more accurate (Haywood, personal communication).

The proposed language indicates that the baseline for the HP calculation is a “fixed” baseline. This clarifies that it will not be allowable to change the baseline (i.e., have a “floating” baseline)

outside of PTI review, a practice that could potentially result in the aggregation of HP increases over multiple rounds of process changes. A “floating” baseline could also contribute to confusion over how the % change in HP should be properly calculated.

The proposed language also makes reference to the date of the promulgation of the air toxics rules on April 17, 1992. This is intended to prevent the grandfathering of sources that have never undergone PTI review under the air toxics rules. Prior to this date, the level of air toxics assessment was inconsistent and should not be relied upon as providing assurance that air toxics emissions and impacts were sufficiently protective of the public health.

As noted by one Member, there is a significant link between the “meaningful change” issue and the proposed restricted TAC list. If the ATW recommends that the AQD adopt a defined list of TACs, and if AQD proceeds to adopt that approach, that will have ramifications on how Rule 285 is applied under the proposed definitions. The key issue is, should non-TACs be accounted for in the HP calculation. If they are not, then the exemption would be more “streamlined”, and, it may encourage some companies to switch to the use / emission of non-TACs. If that occurs to some extent, it may be viewed by some as generally good for the environment, while for others it may raise significant concerns. Some Members felt that companies using the exemption would be involved in proposed process changes due to changes in product specifications or suppliers, and not in a deliberate effort to avoid permitting when changing to more toxic substances that are non-TACs. Staff feels that the procedures under a defined TAC list would still involve agency review of emissions of non-TACs, with potential placement on the TAC list if the listing criteria are met. Therefore, in the proposal, and as demonstrated in the examples in **Attachment 1**, only the listed TACs are accounted for in the HP calculations for the “proposed” scenario. However, a baseline HP remains legitimate even if it was based on a chemical that is not a listed TAC at the time of the proposed change.

A Member suggested that the HP calculation should account for the cumulative emissions and HP for substances that operate via the same mode of action. That has not been done before in the application of the Avery (1993) procedure. And, accounting for potential cumulative air toxics impacts has never been done during permit review under R 225 (although cumulative air toxics impacts have been assessed by staff under R 228, in a few cases). Therefore, this is not currently proposed. Example 1-8 in **Attachment 1** demonstrates the issue.

With the historical implementation of the Rule 285 exemption, as well as under the proposed definitions, there is reliance on whatever SLs are “current” at that point in time. It is recognized that screening levels can change over time. For example, permitted emissions may have accounted for noncarcinogenic effects (ITSLs) in the permit application and review, while more recently one of the substances has been identified and regulated as a carcinogen. Or, an ITSL may have been changed to a more or less stringent value due to recalculation based on better data. Permits to Install do not expire, and permitted air toxics emissions are not re-visited according to any schedule or based on emerging toxicological data and SL changes. A PTI reflects a level of public health protection that is approvable at the time of the permit issuance. The AQD believes that the examples in the attachments address these issues and demonstrate

that the HP comparisons can help ensure public health protection despite changes that may occur to SLs over time.

The initial draft language for “meaningful increase in the quantity of the emission” that was discussed with the Workgroup did not address the issue of a change in the SL over time. One Member stated that leaving that unaddressed could allow an exemption if the increase in PTE is less than 10%, even though the SL has decreased over time, which seems inappropriate. Staff agreed to evaluate and address this concern. Staff also saw a need to address cases where a permitted emission accounted for an ITSL (the only SL available at that time), but since that time an IRSL has been established. Therefore, the revised definition appearing in the present discussion paper update includes the phrase, “...or which results in an increase in the cancer or noncancer hazard potential that is 10% or greater...”. Under this revised language, an increase in the PTE of less than 10% will still be not meaningful as long as the chemical has not had a change in the SL over time, or if the SL has increased. However, if the SL has decreased over time, then the HP calculation is used to determine if there has been a meaningful increase in the HP. If the chemical’s “baseline” accounted for only an ITSL but there is now an IRSL, then there is no cancer baseline established and the exemption cannot be used.

The Workgroup also considered draft definitions for the key terms that tentatively included reference to odor concerns associated with proposed changes. Several Members expressed concerns about this. Staff stated that there could be odor threshold issues with such process changes, and often we might not find out about the odor issue until it is a problem. However, the initial proposed definitions did not call for calculating an HP for odors. Several Members disagreed with involving odor assessment as a regulatory tool in permitting, including exemptions from permitting. They reasoned that R 901 addresses odor problems, and exemptions do not allow a public nuisance. The Workgroup agreed that the odor language should be removed from the proposed definitions that would appear in the rules, but that a Policy and Procedures document should state that odors could potentially be an issue with the process changes, that odor impacts should be considered as appropriate, and that R 901 would apply.

Example calculations

Attachment 1 provides examples of how the above procedure and definition of “meaningful change in the quality and nature” would be implemented. **Attachment 2** provides examples of how the above procedure and definition of “meaningful change in the quantity of the emission” would be implemented. Some key points include:

1. The baseline HP can remain legitimate even if the HP driver is based on a SL that has changed over time. If the chemical which had the change in the SL appears in both the baseline and in the proposed scenario, then the current SL should be used in the HP calculation for the proposed scenario only.
2. The baseline is “fixed”, not “floating”.
3. The promulgation date of the air toxics rules in 1992 serves as a breakpoint to prevent grandfathering.

4. A focus on only the listed TACs for the proposed scenarios would be consistent with the adoption of a defined TAC list and the permitting process while still providing a reasonable assurance of public health protection.

The HP calculations require conversion of ITSLs that do not have annual ATs to “adjusted annual average ITSLs”. The documentation for both the AERSCREEN and the SCREEN3 models provide conversion factors that relate the 1-hr AT modeled impacts to the associated annual AT impacts. The two sets of conversion factors are somewhat different. Staff prefers the use of the AERSCREEN conversion factors only, for consistency and because they are believed to be more accurate (Haywood, personal communication). Table 1 below provides those AERSCREEN conversion factors, and Table 2 provides the associated conversion factors to convert ITSLs with 8 hr and 24 hr ATs to adjusted annual average ITSLs for use in the HP calculations. Tables 3 and 4 provide a summary of the issues evaluated in the examples in Attachments 1 and 2.

Table 1. Averaging time conversion factors in AERSCREEN (EPA, 2011).

Conversion	Conversion factor
1 hr to 8 hr impacts	0.90
1 hr to 24 hr impacts	0.60
1 hr to annual impacts	0.10

Table 2. Averaging time conversion factors for use in HP calculations

Conversion to adjusted	Calculation, based on AERSCREEN factors	Conversion factor to convert ITSL to adjusted annual average ITSL for HP calculations
1 hr AT ITSL to annual	0.1	0.1
8 hr AT ITSL to annual	$0.1 \div 0.9$	0.11
24 hr AT ITSL to annual	$0.1 \div 0.6$	0.17

Table 3. List of the examples of “Meaningful change in the quality and nature” assessments in Attachment 1.

Ex. #	Summary
1-1	Proposed substitution of a baseline carcinogen with a carcinogen.
1-2	Proposed substitution of a baseline noncarcinogen with noncarcinogens; the baseline ITSL has decreased over time.
1-3	Proposed substitution of a baseline carcinogen with a noncarcinogen.
1-4	Grandfathered process proposed for a process change.
1-5	Proposed substitution of a baseline noncarcinogen with a noncarcinogen; the baseline ITSL has increased over time.
1-6	Proposed change from baseline noncarcinogens to a non-TAC.
1-7	Multiple rounds of exemptions over time; baseline is “fixed”, not “floating”.
1-8	Proposed addition of noncarcinogens with the same mode of action; potential concern for cumulative impacts.

Table 4. List of the examples of “Meaningful increase in the quantity of the emissions” assessments in Attachment 2.

Ex. #	Summary
2-1	Proposed increase in the quantity of the emission of a TAC.
2-2	Proposed increase in the quantity of emission of a TAC; the IRSL has decreased over time.
2-3	Proposed increase in the quantity of emission of xylene; the ITSL has had multiple changes over time.

References

Avery, G. 1993. A Description of the New Air Toxic Permit Exemptions Relating to Pollution Prevention. Presented at the 17th Annual Meeting and Spring Conference, Michigan Chapter, East Central Section, Air and Waste Management Association, Detroit, MI; May 11, 1993. Contained as Appendix G in: MDEQ (2005).

EPA. 2011. AERSCREEN User’s Guide. EPA/OAQPS. EPA-454/B-11-001.

Haywood, personal communication. 2013. Discussion with Jim Haywood, meteorologist, MDEQ-AQD, and author of the AERSCREEN model.

MDEQ. 2005. Permit to Install – Determining Applicability Guidebook.
http://www.michigan.gov/documents/deq/deq-ess-caap-pti-determiningapplicabilitygdbk_281875_7.pdf

**Attachment 1. Examples of Draft Methodology for:
“Meaningful Changes in the Quality and Nature” of the Emission of an Air Contaminant
August 22, 2013 Draft**

Based on the methodology and definitions in the August 22, 2013 Updated Draft Discussion Paper on this issue, the following examples illustrate how the method would work. Even if not explicitly stated in these examples, the HP calculations are all appropriately based upon the potential to emit (PTE), and the noncarcinogenicity HPs are all based on adjusted annual averaging times (ATs). As described in the methodology and definitions, an HP is calculated for each chemical and SL in the baseline and future process scenarios. The HP is the PTE divided by the IRSL or ITSL (adjusted to annual AT). HPs for carcinogenic and noncarcinogenic effects are kept separate. Only the highest HP for each scenario (baseline and proposed) is then compared. If the change in HP is less than a 10% increase, then the change is not “meaningful” regarding the air toxics under Rule 285. The following examples focus on the HP calculation and whether or not the change in HP is meaningful or not; as discussed in the methodology and definitions, an exceedance of a permit limit can also trigger a meaningful change. Procedures for determining if changes in criteria pollutant emissions are meaningful will be addressed separately by AQD.

Example 1-1: Substitution of a baseline TAC carcinogen with a proposed TAC carcinogen.

Baseline and Proposal: Carcinogen A had an IRSL of 1 ug/m3 (annual AT) and a potential to emit (PTE) of 0.01 pounds per hour (PPH), according to a 1993 permit application that underwent permit review and resulted in permit issuance without a limit for this substance. Today, that IRSL is the same value. It is proposed that carcinogen A be replaced by carcinogen B, with an IRSL of 0.08 ug/m3 and a potential to emit of 0.001 PPH.

Assessment: The baseline was established by permit application and review after the air toxics rules were promulgated on 4/17/92, and an IRSL was in place at that time. Therefore, the emission rate was approvable at that time. The baseline HP is the hourly PTE ÷ the IRSL; the baseline HP = 0.01. The proposed HP is 0.0125. The proposed change represents a 25% increase in the HP. This change is “meaningful” and is not exempt from permitting. It may be noted that the baseline modeled impact was twice the IRSL; the source was approvable because the impact did not exceed the SRSL (10 ug/m3). Although the baseline impact was only 20% of the SRSL, the comparison of the proposed HP to the baseline HP does not give “credit” for a baseline modeled impact that is far below the SL.

% Increase in HP = [(0.0125 - 0.01) ÷ 0.01] X 100 = 25% increase in HP

Chemical	PTE (pph)	Modeled impact ug/m3 (AT)	IRSL (ug/m3)	ITSL (ug/m3)	AT	ITSL AT conversion factor	Adjusted annual AT ITSL	HP (PTE÷ IRSL or annual ITSL)
Baseline:								
A	0.01	2. (ann.)	1.					0.01
Proposed:								
B	0.001		0.08					0.0125

Example 1-2: Substitution of baseline noncarcinogens with a proposed emission of different noncarcinogens; the baseline ITSL has decreased over time.

Baseline and Proposal: Three VOC noncarcinogens were listed in a permit application for a process in 2005. The permit application was approved with a limit on total VOCs, but with no limit on these specific VOCs. The company now proposes to change from these VOCs to a different single VOC in the process. The permit limit for total VOCs will not be exceeded. The baseline was established with a highest HP value of 10. In 2008, the ITSL for the HP driver substance had a 10-fold decrease in the ITSL (annual average), and based on the *current* ITSLs for all the baseline VOCs, the highest HP value is 100. The proposed VOC has a HP value of 15.

Assessment: The baseline HP remains at 10, despite the change over time of the ITSL for the HP driver. Therefore, the proposed change represents a 50% increase in the baseline HP, which is meaningful; it would not be exempt from permitting.

$$\% \text{ Increase in HP} = [(15 - 10) \div 10] \times 100 = 50\% \text{ increase in HP}$$

It may be noted that a recalculation of the baseline HP using the current, lower ITSL for chemical A would result in a much higher HP (100), and the proposed HP (15) is lower than that. However, as stated above, the baseline HP is established at the time of the baseline permit application and review; it does not change over time if the SLs change. It is reasonable that this proposed change should not be exempted and should require a permit application, because the 2005 SL, PTE, and dispersion characteristics that were approvable in 2005, coupled with an increase of 50% in the HP, suggest that the proposed emissions would be “meaningful”. It would not be appropriate to recalculate a higher baseline HP based on the SL change, re-set the baseline for the HP comparison outside of any permit review, and potentially conclude that this proposed HP is not meaningful.

Chemical	PTE (pph)	Modeled impact ug/m3 (AT)	IRSL (ug/m3)	ITSL (ug/m3)	ITSL AT	ITSL AT conversion factor	Adjusted annual AT ITSL	HP (PTE÷ IRSL or annual ITSL)
Baseline (2005):								
A	100	10 (ann.)		10	annual	1	10	10
B	0.5	0.5 (8 hr)		500	8 hr	0.11	55	0.009
C	0.1	0.5 (1 hr)		10	1 hr	0.1	1	0.1
(Change in ITSL A in 2008, shown here only for demonstration purposes):								
(A)	(100)			(1)	(annual)	(1)	(1)	(100)
Proposed:								
D	10			3.9	24 hr	0.17	0.66	15

Example 1-3: Substitution of a baseline carcinogen with a proposed noncarcinogen.

Baseline and Proposal: The baseline involved 3 carcinogens only, with a highest carcinogenicity HP of 10. The proposal is to replace those with one noncarcinogen, with a noncarcinogenicity HP of 10.

Assessment: Although the HPs seem to suggest that this particular proposal may be approvable under Rule 225, the methodology does not allow calculations of HP change between carcinogens and noncarcinogens. The proposed change is not exempt from permitting. This is appropriate because cancer and noncancer hazards and risks are distinctly different and are managed differently in the air toxics regulatory program. For example, a carcinogen HP would be calculated based on the PTE and the IRSL, while a permit review may find acceptability of impacts based on compliance with the SRSL and up-to-tenfold higher allowable impacts on industrial property or public roadways. This does not relate readily to an assessment of meaningful change involving noncarcinogens. In the table below, it may be noted that the modeled impact for the baseline was 1 ug/m³, which is 100 times higher than the IRSL (0.01 ug/m³); this was approvable because the SRSL was used and the impacts exceeding the SRSL were on industrial property or roadways and did not exceed the SRSL by more than 10.

Chemical	PTE (pph)	Modeled impact ug/m ³ (AT)	IRSL (ug/m ³)	ITSL (ug/m ³)	ITSL AT	ITSL AT conversion factor	Adjusted annual AT ITSL	HP (PTE ÷ IRSL or annual ITSL)
Baseline:								
A	0.1	1. (ann.)	0.01					10
B	0.01	0.1(ann.)	0.1					0.1
C	0.01	0.1(ann.)	1					0.01
Proposed:								
D	10			1	annual	1	1	10

Example 1-4: Grandfathered process proposed for a process change.

Baseline and Proposal: The process at this source has not undergone a permit review since the air toxics rules were promulgated on 4/17/92. They propose to replace a mixture that could be calculated to have a carcinogen HP of 10 and a noncarcinogen HP of 15 (based on the present-day IRSL and ITSL, respectively) with a mixture that has no carcinogens and a noncarcinogen HP of 10.

Assessment: Since a baseline was not established via permit review under the air toxics rules, it cannot be assumed that the historical or the proposed emissions provide the level of public health protection established under the air toxics rules. In other words, the acceptability of the historical emissions and impacts, based on the air toxics rules' benchmarks of acceptability, is unclear. Therefore, there is no benchmark HP established, and the proposed change is not exempt from permitting.

Chemical	PTE (pph)	Modeled impact ug/m3 (AT)	IRSL (ug/m3)	ITSL (ug/m3)	ITSL AT	ITSL AT conversion factor	Adjusted annual AT ITSL	HP (PTE÷ IRSL or annual ITSL)
Historical:								
A	10	Acceptability unclear	1					(10? cannot establish baseline)
B	165			100	8 hr	0.11	11	(15? cannot establish baseline)
Proposed:								
C	50			5	annual	1	5	10

Example 1-5: Substitution of a baseline noncarcinogen with a proposed noncarcinogen; the baseline ITSL has increased over time.

Baseline and Proposal: A baseline was established in a 2000 permit application, which resulted in permit limits for each of the air toxics. The 2 noncarcinogens had a highest HP of 100, posed by chemical A. Since that time (in 2010), the ITSL has increased by a factor of 10; as a result, the HP using that current ITSL *could* be recalculated to be 10. The proposed change would involve 2 different noncarcinogens, with a highest HP of 109.

Assessment: This proposed change represents a 9% increase in the baseline HP (from 100 to 109). This is not meaningful; it meets the exemption from permitting for air toxics. This finding is notwithstanding the now-lower HP (10) that *could* be calculated for the baseline emission of chemical A using the current ITSL (which, if compared to the proposed emission, would seem to result in a “meaningful” 990% increase in the HP). The finding of a non-meaningful change is reasonable, because the SL value, emission rate and dispersion modeling that were reviewed in 2000 for the baseline permit application determined that the emission was approvable (i.e., the ITSL value was not exceeded); those relationships still indicate that the proposed change would not be meaningful. In other words, if modeling were to be performed for chemicals C and D, there is presumptive evidence that it would pass modeling, in this case. Generally, at worse, the ITSL would not be expected to be exceeded by 10% or more if the increase in HP is less than 10%. The baseline established in 2000 is still valid, even though the ITSL for chemical A has increased over time.

$$\% \text{ Increase in HP} = [(109 - 100) \div 100] \times 100 = 9\% \text{ increase}$$

Chemical	PTE (pph)	Modeled impact ug/m3 (AT)	IRSL (ug/m3)	ITSL (ug/m3)	ITSL AT	ITSL AT conversion factor	Adjusted annual AT ITSL	HP (PTE÷ IRSL or annual ITSL)
Baseline:								
A	20	0.15(ann)		0.2	annual	1	0.2	100
B	10	20 (8 hr)		20	8 hr	0.11	2.2	4.5
(Change in ITSL A in 2010, shown here only for demonstration purposes):								
A	(20)			(2)	(annual)	(1)	(2)	(10)
Proposed:								
C	109			1	annual	1	1	109
D	300			300	1 hr	0.1	30	10

Example 1-6: Baseline is for a non-TAC.

Baseline and Proposal: In 2005 a coating process was permitted, including three noncarcinogenic TACs, with a permit limit for total VOCs. In 2015, the company proposes to change coatings, which would result in five different noncarcinogenic VOCs. They would not exceed their VOC permit limit. The baseline HP is 10, based on a compound that is not a listed TAC based on the air toxics rules revisions in 2014 which resulted in a defined TAC list. The next highest baseline HP is 1. The proposed change would involve 4 VOCs, of which only 2 are on the TAC list in 2015. The highest HP for the 2 TACs in the proposal is 10.

Assessment: The baseline HP is the highest HP for the air toxics that were described and evaluated in the 2005 permit application, permit review, and permitting, regardless of whether or not the HP driver is a listed TAC at the future date of a proposed process change. Even if the highest HP is based on a chemical that is no longer a TAC, that HP is a valid metric of the relationship between the emission rate and an approvable impact. The proposed HP is the highest HP of the TACs that are listed at the time of the proposed change (2015), so that assessment would include only the 2 listed TACs among the 4 VOCs in the proposal. Therefore, the baseline HP is 10 and the proposed HP is 10. There is no increase in the HP, so the proposed change meets the exemption from permitting for air toxics.

This is proper because the 2005 permit application and review accounted for the TACs, emission rates and impacts, which set the baseline appropriately despite the fact that the HP driver is not a listed TAC in 2015. The 2015 proposal focuses on only the listed TACs. Compounds in the proposal that are not listed TACs do not enter into the HP assessment. The rationale for this is that, if the source does go through permitting in 2015, the non-TACs would not need to be evaluated by the permit applicant for the acceptability of impacts. The non-TACs would also not be *routinely* evaluated by the AQD (they would only be evaluated, under R 228 authority, if AQD staff had a particular concern for the substance and emission rate).

Chemical	PTE (pph)	Modeled impact ug/m3 (AT)	IRSL (ug/m3)	ITSL (ug/m3)	ITSL AT	ITSL AT conversion factor	Adjusted annual AT ITSL	HP (PTE÷ IRSL or annual ITSL)
Baseline:								
A	1	0.1 (ann)		0.1(default)	Ann.	1	0.1	10
B	0.7	0.07(ann)		0.7	Ann.	1	0.7	1
C	0.4	0.04(ann)		100	Ann.	1	100	0.004
Proposed:								
D	1			0.1	Ann.	1	0.1	10
E	100			40	Ann.	1	40	2.5
F	100			Non-TAC				N/A
G	100			Non-TAC				N/A

Example 1-7: Multiple rounds of exemptions over time.

Baseline and Proposal: A coating operation was permitted in 2000 with a permit limit for total VOCs and a permit limit for one noncarcinogenic TAC. All of the VOCs were noncarcinogenic. The baseline HP is 10. In 2015, they propose a change in the coating, replacing these VOCs with several other noncarcinogenic VOCs, only 3 of which are listed TACs. They do not exceed their VOC limit. The highest HP for the 2015 proposal is 2 (based only on the listed TACs). They qualify for the exemption, and do not apply for a permit. In 2017, they propose to make another change in the coating, involving several noncarcinogenic VOCs; among the 2 that are listed TACs, the highest HP is 8. Again, the VOC permit limit would not be exceeded.

Assessment: In 2017, the baseline HP is still 10; it did not change to 2 with the coating change in 2015, because they did not undergo permit review (if they had applied for and obtained a permit in 2015, that would have re-set the baseline.) Therefore, the proposed coating change in 2017, with a HP of 8 (a reduction from a baseline HP of 10), meets the exemption from permitting for air toxics.

Chemical	PTE (pph)	Modeled impact ug/m3 (AT)	IRSL (ug/m3)	ITSL (ug/m3)	ITSL AT	ITSL AT conversion factor	Adjusted annual AT ITSL	HP (PTE÷ IRSL or annual ITSL)
Baseline:								
A	220	150(8 hr)		200	8 hr	0.11	22	10
Change in 2015 (exempt from permitting):								
B	66			300	8 hr	0.11	33	2
C	20			20	annual	1	20	1
D	25			50	annual	1	50	0.5
Proposed in 2017:								
E	220			250	8 hr	0.11	27.5	8
F	200			40	annual	1	40	5

Example 1-8. Proposed addition of noncarcinogens with the same mode of action; potential concern for cumulative impacts.

Baseline and Proposal: A company was permitted in 2013 for a process involving sulfuric acid emissions. Sulfuric acid has two ITSLs; the highest HP of 10 is derived from the annual ITSL. In 2015 they propose a change in the formulation used in that process; the new formulation contains the same level of sulfuric acid (so the emissions of sulfuric acid would not change), but it also has hydrogen bromide and hydrogen chloride (a.k.a., hydrochloric acid). The critical toxic effect of all three acids is irritancy to the eyes, nose, throat, and respiratory tract. All three acids have ITSLs with 1 hr ATs. The sulfuric acid and the hydrogen chloride also have ITSLs with annual ATs.

Assessment: Since there is no increase in the HP posed by the proposal, it is regarded as not meaningful and it meets the exemption from permitting for air toxics.

The common mode of action (irritancy), and the co-emission and therefore common points of modeled maximum ambient air impact, may raise a concern for a potential cumulative effect of irritancy. The HP procedure does not account for potential cumulative impacts. In this particular example, the baseline modeling resulted in modeled maximum ambient air impacts that were only 50% of the ITSL (annual AT) and 42% of the ITSL (1 hr AT). Although in some cases, an approved emission has a modeled impact that approaches or matches the SL, it is much more typical that proposed emissions are modeled to be well below the SL, as in this example. Nevertheless, as in this example, the procedure can result in an exemption when additional chemical emissions could have an interactive effect. However, proposed changes would not be exempted if they would pose an increase in HP of 10% or greater. This restriction seems to limit the potential concern for cumulative effects. And, if such process modifications appeared in a permit application, they would typically not be evaluated for cumulative impact potential, except in infrequent cases under R 228 authority. In those cases of R 228 review, all relevant case-specific information would be taken into account, including reasonably anticipated environmental impacts and exposures, rather than a focus on only the modeled maximum ambient air impacts. For example, in this hypothetical situation, the baseline HP is driven by the modeled maximum ambient air impact with an annual averaging time, and, we can presume from the baseline modeling findings that the impacts in the proposal would all meet their respective ITSLs. This information alone does not suggest that this situation would raise sufficient concern for cumulative impacts to warrant more stringent emission limits under R 228.

Chemical	PTE (pph)	Modeled impact ug/m3 (AT)	IRSL (ug/m3)	ITSL (ug/m3)	ITSL AT	ITSL AT conversion factor	Adjusted annual AT ITSL	HP (PTE÷ IRSL or annual ITSL)
Baseline:								
Sulfuric acid	10	0.5(ann.)		1	annual	1	1	10
Sulfuric acid	10	50 (1 hr)		120	1 hr	0.1	12	0.83
Proposed:								
Sulfuric acid	10			1	annual	1	1	10
Sulfuric acid	10			120	1 hr	0.1	12	0.83
Hydrogen bromide	10			70	1 hr	0.1	7	1.4
Hydrogen chloride	40			20	annual	1	20	2
Hydrogen chloride	40			2100	1 hr	0.1	210	0.19

**Attachment 2. Examples of Draft Methodology for:
“Meaningful Increase in the Quantity of the Emission” of an Air Contaminant
August 22, 2013 Draft**

Based on the methodology and definitions in the August 22, 2013 Updated Draft Discussion Paper on this issue, the following examples illustrate how the method would work. Even if not explicitly stated in these examples, the HP calculations are all appropriately based upon the potential to emit (PTE), and the noncarcinogenicity HPs are all based on adjusted annual averaging times (ATs). As described in the methodology and definitions, an HP is calculated for each chemical and SL in the baseline and future process scenarios. The HP is the PTE divided by the IRSL or ITSL (adjusted to annual AT). HPs for carcinogenic and noncarcinogenic effects are kept separate. Only the highest HP for each scenario (baseline and proposed) is then compared. If the change in HP is less than a 10% increase, then the change is not “meaningful” regarding the air toxics under Rule 285. The following examples focus on the HP calculation and whether or not the change in HP is meaningful or not; as discussed in the methodology and definitions, an exceedance of a permit limit can also trigger a meaningful change. Procedures for determining if changes in criteria pollutant emissions are meaningful will be addressed separately by AQD.

Example 2-1. Proposed increase in the quantity of the emission of a TAC.

Baseline and Proposal: A source was permitted in 1995 for an emission of chemical A. A permit limit was not included for chemical A in the permit. They would like to increase production by 10%, resulting in a 10% increase in the emission of chemical A. There has been no change in the SL for chemical A over time.

Assessment: The baseline is set by the emission rate as stated in the permit application, regardless of whether or not there is a permit limit. The modeling performed by the applicant and the agency in 1995 showed that the modeled maximum ambient air impact was only 50% of the ITSL. Nevertheless, the baseline HP of 10 would be increased by 10% in the proposal, therefore the proposal is regarded as a meaningful increase in emission and it is not exempt.

Chemical	PTE (pph)	Modeled impact ug/m3 (AT)	IRSL (ug/m3)	ITSL (ug/m3)	ITSL AT	ITSL AT conversion factor	Adjusted annual AT ITSL	HP (PTE÷ IRSL or annual ITSL)
Baseline:								
A	10	0.5(ann.)		1	annual	1	1	10
Proposed:								
A	11			1	annual	1	1	11

Example 2-2. Proposed increase in the quantity of emission of a TAC; the IRSL has decreased over time.

Baseline and Proposal: A source was permitted in 2010 for a process with an emission of carcinogen A. They now propose a 5% increase in the process emission of this chemical. The IRSL was reduced in 2011 from 0.1 ug/m3 to 0.01 ug/m3.

Assessment: The baseline was approvable because the source complied with the SRSL; note that the modeled impact exceeded the IRSL, but only 5-fold, indicating that the SRSL was not exceeded. The baseline HP, which is based on the IRSL, is 100. An increase in emissions of only 5% would qualify for the exemption if there was no change in the IRSL. However, the IRSL has decreased, therefore the change in HP must be evaluated. Any decrease in the SL since the baseline was established must be accounted for in the “proposed” HP calculation for a proposal to increase the quantity of the emission of a TAC, just as it was in the **Attachment 1** examples of proposed changes in the quality and nature of TAC emissions. The proposal is associated with a 950% increase in the HP, utilizing the current IRSL for the “proposed” HP calculation; this is a meaningful increase and it is not exempt.

% Increase in HP = [(1050 - 100) ÷ (100)] X 100 = 950% increase

Chemical	PTE (pph)	Modeled impact ug/m3 (AT)	IRSL (ug/m3)	ITSL (ug/m3)	ITSL AT	ITSL AT conversion factor	Adjusted annual AT ITSL	HP (PTE÷ IRSL or annual ITSL)
Baseline:								
A	10	0.5	0.1					100
Proposed:								
A	10.5		0.01					1050

Example 2-3. Proposed increase in the quantity of emission of xylene; the ITSL has had multiple changes over time.

Baseline and Proposal: A source was permitted in November, 1992 for a process with xylene emissions. The baseline HP was 10. In 2015, they propose to increase the xylene emissions 5%, from 510 pph to 535.5 pph.

Assessment: The proposed increase in the PTE is less than 10%, therefore it would meet the exemption if there was no change in the baseline SL. Since there has been a change in the baseline SL, the change in HP must be evaluated to see if there is a meaningful increase in the HP.

At the time of permitting in November, 1992, the ITSL for xylenes (mixed) was 300 ug/m3 (24 hr AT). In 1993, the AQD's Scientific Advisory Panel recommended that the ITSL should be changed to 4400 ug/m3 (1 hr AT), and AQD made that change. In 2003, the U.S. EPA finalized an RfC for xylenes in the IRIS database, and the AQD changed the ITSL to 100 ug/m3 to be consistent with the RfC. At that time, the default AT assigned to RfC-based ITSLs was 24 hours, so the ITSL was set at 100 ug/m3 with a 24 hr AT. In 2014, AQD promulgated rule changes which included a change in the default AT from 24 hours to annual for all ITSLs derived via the RfC or RfD methodologies, based on recommendations from their Air Toxics Workgroup in 2013. Therefore, in 2014 the ITSL changed to 100 ug/m3 (annual AT).

% change in HP = $[(5.35 - 10) \div 10] \times 100 = 46\%$ decrease

The baseline HP establishes a finding of acceptability for the SL value and the emission rate, accounting for the modeling of ambient air impacts. That baseline finding remains valid even if the SL changes over time. The 2015 proposal to increase the xylene emission rate must be evaluated with a "proposed" HP using the ITSL that is current at that time. Based on that HP comparison, the proposed change represents a decrease in the HP, which is regarded as not meaningful and meets the exemption for air toxics. For demonstration purposes, the interim changes in the ITSL are shown in the table below, although they do not pertain to the 2015 HP comparison. Note that, if the change was proposed when the ITSL was 100 ug/m3 (24 hr AT), the HP increase (from 10 to 31.5) would have been 215%, and would not have been exempt.

Chemical	PTE (pph)	Modeled impact ug/m3 (AT)	IRSL (ug/m3)	ITSL (ug/m3)	ITSL AT	ITSL AT conversion factor	Adjusted annual AT ITSL	HP (PTE ÷ IRSL or annual ITSL)
Baseline in 1992:								
xylene	510	200		300	24 hr	0.17	51	10
(interim changes in ITSL, shown here only for demonstration purposes):								
xylene	(535.5)			4400	1 hr	0.1	440	(1.2)
xylene	(535.5)			100	24 hr	0.17	17	(31.5)
Proposed in 2015:								
xylene	535.5			100	annual	1	100	5.35